

To keep the volume a reasonable size the addition of this new matter has compelled the author to reserve for a second volume the subjects which were formerly discussed in the last two chapters, namely, life and the classification of the sciences. In other respects there is singularly little change, the author being evidently convinced that the original statement could not be improved upon. It is a pity, perhaps, that some of the more polemical sections have not been modified so as to prevent misunderstanding as to the intention of some of the earlier writers who are attacked. Prof. Pearson himself speaks of "the acceleration of A due to B," but carefully adds a footnote to guard the reader against taking the phrase in its obvious meaning. Newton and others were guilty of similar anthropomorphism, for which they are denounced. They failed to add warning footnotes, partly because they had a grand faith in the common sense of their readers, partly because they were writing a constructive scientific treatise, and not a critical grammar of science. These attacks, however, add spice to the pages of a book which excels in the clearness with which the significance of natural law is discussed.

It should be mentioned in conclusion that chapter x., on modern physical ideas, is contributed by Prof. E. Cunningham. The scope of the chapter is sufficiently indicated by the titles of a few of the sections, such as: the electromagnetic constitution of the atom, electromagnetic mass, fluid or space distribution of electricity, and the theory of relativity. The expanded second volume of this interesting work will be looked forward to with great expectations.

A BIOLOGICAL DICTIONARY.

Wörterbuch der Biologie. By Dr. Heinrich Schmidt. Pp. viii+581. (Leipzig: Alfred Kröner, 1912.) Price 10 marks.

WRITERS on biological subjects have always used a rich vocabulary, but with the growth of information and knowledge there has arisen such a wealth of technical terms and of classificatory nomenclature that readers, and even writers themselves, are often at a loss, and it is difficult to refer an inquirer to any handy work containing an adequate glossary of terms used in anthropology, botany, and geology. Ziegler's "Zoologisches Wörterbuch" supplies the want for zoologists, and supplies it well, but there is undoubtedly room for such a dictionary as this which Dr. Schmidt has written. At a rough estimate it contains 10,000 definitions, and the labour of compiling it must have been very great, for not only are descriptive words explained

but there are also many generic terms and expressions that appeal only to the advanced systematist. The derivations of the words are not given.

Use, and use alone, can test the value of this dictionary. So far as we have been able to determine its accuracy and inclusiveness, the work has stood the test very well. As an example of the unexpectedly interesting information afforded in dealing with arid or forbidding names, we select "Lebensdauer." Under this heading a most interesting summary is given of the relative longevity of plants and animals. We are told on the authority of Hesse's work, "Tierbau und Tierleben," that an earthworm lives ten years, a leech twenty or even twenty-seven years, a pond mussel twelve years, a (fresh-water) pearl mussel fifty to a hundred years. Most of the definitions we have examined seem well arranged, though here and there a little inaccuracy has crept in. For example, under "body-cavity" we are told that a true coelom is well-developed in limulus, spiders, millipedes, and insects, whereas, of course, the well-developed cavity in these animals is not a true coelom at all.

The terms used in classification seem needlessly numerous, and are sometimes very unhappily expressed. Protozoa, for example, are divided into "Cytomorphæ" and "Cytoideæ," a new and abominable classification. Certain cases of omission have occurred in the course of a few days' use. The term "lipoids," about which so much is heard just at present, might have been included. The class of pigments known as lipochromes is left out, whilst the melanins are included. But these considerations are of small account in comparison with the mass of successful definitions which testify to the author's tireless researches. A few illustrations are given, and a geological table is added as an appendix.

OUR BOOKSHELF.

Links with the Past in the Plant World. By Prof. A. C. Seward, F.R.S. Pp. ix+142. (Cambridge: University Press, 1911.) Price 1s. net.

THE object of this neat little volume is best explained in the author's words. "I hope," he says, "that I may succeed in attracting some of my readers who are already interested in living plants to the study of plants of former ages." The book is likely to fulfil its purpose. Without attempting any serious discussion of evolutionary theories, the author brings home to the reader the deep interest of a number of problems in the history of plants and their distribution.

The introductory chapter begins with the always attractive subject of the longevity of trees, and explains very clearly how a tree grows

and the nature of the so-called annual rings. From the age of individuals we are led on to archaeological evidence of antiquity. "From the period claimed by archaeologists we pass by gradual stages into the domain of the geologist."

Before entering on this field, a chapter on geographical distribution, a subject of which the importance has not always been realised by modern students, is appropriately introduced. Darwin's high appreciation of the study of distribution, which he called "that almost keystone of the laws of creation," is emphasised. Quite recently, interest in distribution, stimulated by the kindred study of ecology, has much revived.

In his sketch of the geological record, Prof. Seward points out that the history of the world's flora must go back immensely farther than our records show. "The relics of plant-life furnished by the Devonian and succeeding formations represent the upper branching-systems of a deeply rooted and spreading tree, the lowest portions of which have been destroyed or have left no sign of their existence" (p. 44).

The preservation of plants as fossils is the subject of chapter iv. A particularly striking picture of the flood-plain of the Rio Colorado, with drift-wood stretching over a tract 25 miles across, gives a vivid idea of how a fossil "pine-raft" may have been formed.

The four succeeding chapters illustrate the general theme by special examples of "links with the past," taken from the ferns, the big trees of California, the Araucaria family, and the maiden-hair tree.

The illustrations throughout are remarkably good. Mr. Tansley's photographs of Malayan ferns are of exceptional beauty. The book concludes with a full bibliography and a useful index.

D. H. S.

How to Attract and Protect Wild Birds. By M. Hiesemann. Translated by Emma S. Buchheim. With an introduction by Her Grace the Duchess of Bedford. Second edition, with many revisions. Pp. 101. (London: Witherby and Co., 1911.) Price 1s. 6d. net.

WE have already directed attention (NATURE, July 22, 1909) to the first edition of the useful little work by Martin Hiesemann on the practical preservation and protection of birds by the provision or creation of opportunities for their breeding, winter feeding, and by fighting the enemies of birds, and little remains to be said of the second edition except that it has been revised and enlarged in many essential points. This excellent little book was written for Germany, where the birds' natural conditions of life differ somewhat from those prevailing in this country. For instance, our winters are less severe, and so less systematic feeding at that season may be necessary; our country is, generally speaking, less open and more wooded (hedgerows, gardens, and ornamental grounds and plantations being taken as woodlands in this connection), so that the provision of special breeding plantations may

not be desirable here. Our birds of prey have been closely killed down, and there seems to be no way (permitted by law) of dealing with the domestic cat, the birds' worst enemy in this country.

But the portion of the book dealing with the provision of nesting places for birds which breed in holes deserves the closest consideration by those who wish to encourage the different species which fall under this category; for the difficulty experienced by these birds in finding nesting places has greatly increased, since by the rules of modern forestry nearly every old tree is felled, without regard to the fact that the holes it contains serve as shelters and nesting places. Those men who care only for what is of practical use grudge the old, decayed trees the little space on which they stand, and prefer to convert them into firewood. The remedy for this is the provision of nesting boxes, and we are told here what is the right sort of box, and the right—and the wrong—way of hanging them up. The illustrations are numerous and very useful.

Applied Biology. An Elementary Textbook and Laboratory Guide. By Prof. M. A. Bigelow and Anna N. Bigelow. Pp. xi+583. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1911.) Price 6s. net.

THIS volume has been prepared for use in higher schools during a year's course of five hours per week. The frog and the bean-plant are taken as types for the study of animal- and plant-structure and biology. The succeeding part of the book contains an account of the structure and life-histories of "seed-plants" and "spore plants" (ferns, mosses, algæ, fungi, and bacteria). The chief phyla of the animal kingdom are traversed in the third part of the book; but the authors have attempted to compress too much material into these 140 pages, with the result that many subjects are necessarily considered so briefly that only imperfect ideas of them are conveyed. For instance, "Paramecia reach a state when they are unable to continue to divide. Two such individuals come into contact, and through their delicate cell-walls some of the nucleus of each one passes over to join the nucleus of the other,"—is surely an incorrect and inadequate account of the conjugation phenomena. There are a few slips in this part of the work, e.g., the sword-fish is placed among the cartilaginous fishes. The succeeding part of the work deals in an interesting manner with the structure of the human alimentary canal, digestion, food-values, blood, respiration, excretion, and nervous activity, and leads up to an application of biological principles to personal hygiene.

The book contains much information on biological subjects of public interest, e.g., toxins and anti-toxins, mosquitoes and flies in relation to disease, the bacterial treatment of sewage, parasites in meat, and shows clearly the important bearing of a knowledge of biological science on many aspects of human life.